Disability, life satisfaction and social interaction in Italy

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Abstract

This paper will focus on the living conditions of disabled people with different degree of limitations as regards to daily activities.

In a first step of analysis we focus on the predictors of four specific domains of life satisfaction. In a second step, we attempt to define the different well-being dimensions of disabled people by using the indicators available in the 2011 ISTAT Survey on social inclusion of people with disabilities and by comparing the well-being attainments with respect to the different levels of functional limitations. Given the relevance of social interaction in the life satisfaction of individuals, we focus on this dimension of well-being by analysing the effect of functional limitations on its development, measured by using the observable indicators on the satisfaction of interaction with friends and relatives, the extent of this interaction, and frequency and satisfaction on internet use.

Key words: disability, well-being, life satisfaction, social interaction.

Introduction[1]

The interest for subjective well-being (SWB), happiness and life satisfaction has increased during the last years also in socio-economic literature. In this context, life satisfaction measures how people evaluate their life as a whole rather than their current feelings. It captures a reflective assessment of which life circumstances and conditions are important for subjective well-being (OECD, 2012).

As underlined by Conceição and Bandura (2008), happiness and life satisfaction are components of SWB, where life satisfaction reflects individuals' perceived distance from their aspirations. Life satisfaction captures a reflective assessment of which life circumstances and conditions are important for subjective well-being and it has been considered to be a central aspect of human welfare (Haybron, 2005). According to psychology, life satisfaction is a cognitive element of SWB, and SWB is comprised by four elements: pleasant emotions, unpleasant emotions, life evaluation and domain satisfaction (including health, relationships, leisure, economic conditions and so on). Even if according to the psychological literature life satisfaction and happiness diverge, economists have used them as synonymous.

The increasing literature focusing, in turn, on SWB, life satisfaction and specific domains of satisfaction, has been sometimes intersected with specific sub-groups of analysis. However, while the medical and psychological researches have devoted attention to the specific situation of disabled people, the economic literature include only few papers analyzing these specific sub-groups.

This paper brings new evidence about life satisfaction of disabled people in Italy, analyzing information on people with functional limitations and health problems who live in households, as provided by the 2011 ISTAT survey. The dataset oversamples those individuals with limitations showing also a high age on average. Moreover, the case of Italy could be particularly interesting because of the increasing ageing of Italian population and of the increase of elderly people not in good health.

The analysis is twofold. In a first step we focus on the predictors of four specific domains of life satisfaction of sampled individuals: satisfaction with relatives relations, friends relations, economic conditions and leisure time; and second, we analyze the presence of unobservable factors jointly affecting the four satisfaction domains. In a second step, given the relevance in individual well-being of social interaction, we have analysed more in depth this dimension of social well-being and

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measured it as a latent variable by estimating a MIMIC model, which allows us to consider simultaneous indicators and also exogenous causes for the latent factor called 'social interaction'.
This paper is divided as follows. In section 1, we refer to the literature on life satisfaction and social interaction. In section 2, we introduce the data analysed and we describe the characteristics of the population. In section 3, we present the methodologies and the empirical models employed, while in section 4 are summarized the main empirical findings of the paper. Finally, section 5 wraps up the analysis with some concluding remarks.

1. Disability, life satisfaction and social interaction: the literature

The economic literature focusing on subjective well-being has increased strongly in the last decades. Recent studies have particularly exploited both large datasets to enrich the set of factors to control variability in subjective well-being and the panel structure of data to control the role of time-invariant individual effects, including personality (Dolan et al., 2008). This strand of literature includes studies focusing on life satisfaction (e.g. job satisfaction, relationship satisfaction, health satisfaction), that may be seen as a partial aspect of well-being.
Evidence on subjective well-being has highlighted the role of income, personal characteristics (e.g. age, gender, ethnicity, personality), socially developed characteristics (e.g. education, health, work), time allocation (e.g. hours worked, care activities, community involvement and volunteering, exercise, religious activities), attitudes and beliefs, relationships (including marriage, having children, seeing family and friends) and economic, social and political environment. Even though results cannot be considered as conclusive, milestones from these studies suggest to consider the impact of income, relative income, health, personal and community relationship, employment and marital status in their analysis.
When focusing on disability, the literature is more recent but limited.. A relevant finding connected to activity limitations and ageing (then strictly connected with limitations in daily activities) concerns its U-shaped form effect, for which higher well-being is found for younger and older individuals (Easterlin, 2006; Blanchflower and Oswald, 2008). In this context, analyzing older married adults, Freedman et al. (2012) find that disability affects negatively subjective well-being, and that well-being variability, because of disability, is greater for somatic symptoms and for satisfaction with health or memory, while the support of participation is only limited. Nevertheless, Riis et al. (2005) find only small differences in the reported life satisfaction or happiness between disabled and non-disabled people.
As anticipated, a wide literature concerns life satisfaction and its intersection with specific sub-groups, including disability. However, life satisfaction and disability have been topics of analysis

especially in medical and psychological research fields, while socio-economic literature is quite limited

A stream of the medical and psychological literature has looked at the association between physical disability and life satisfaction. Menhert et al. (1990) find evidence of a negative relationship, even if the extent of disability seems to be irrelevant in determining the extent of life satisfaction (Nosek, Fuhrer and Potter, 1995). A study by Kinney and Coyle (1992) shows that the most significant predictor of life satisfaction of physically disabled people is the leisure satisfaction, and that a significant role is played by financial status, self-esteem, health satisfaction, religious activities and marital status. Lucas-Carrasco and Salvador-Carulla (2012) examine life satisfaction among intellectually disabled people. They find that those living in residential institutions are less satisfied when compared with persons living in community facilities or living at home, and that health, relationships, home environment and job are relevant in determining life satisfaction. In a older study, Schwartz and Rabinovitz (2003) find that life satisfaction of people with intellectual disability living in community residences is positively correlated with that of the community's staff. Miller and Chan (2008) find that life satisfaction of intellectually disabled people is significantly associated, among others, to social support and interpersonal skills. Jang et al. (2004), investigate the role of social engagement in life satisfaction. They find that individuals with both disease and disability have significantly lower levels of participation in social activities and life satisfaction, and that social engagement explains more of life satisfaction when compared with individuals with a disease but no disability. Mailhan et al. (2005), studying life satisfaction after a severe traumatic brain injury, find that disabled patients were on average slightly dissatisfied with their cognitive functions, physical abilities and self-esteem. Mollaoğlu et al. (2010) focus on the life satisfaction of elderly people with mobility disability. They find that disability affect significantly their life satisfaction, and that age, education and health perception level are key-variables in explaining life satisfaction. Osberg et al. (1987) find that life satisfaction of elderly disabled people is strictly connected to functional capacity.

The socio-economic literature include, amongst others, a old study by Grant and Chappell (1983), that investigates elderly disabled attending three days hospital in Canada. They find a significant role by perceived health, ethnicity and differential services. More recently, the effect of disability on life satisfaction mainly exploited the longitudinal dimension of databases to focus on the relationship between life satisfaction and the adaptation of disabled people to the disability shock. Evidence on that hasbeen mixed (Easterlin, 2005). An initial negative effect of disability on life satisfaction that fades away over time is found, amongst others, by Pagán-Rodríguez (2010) on German Socioeconomic Panel data; partial adaptation is found by Oswald & Powdthavee (2008),

whileno evidence of this adaptation effect is found by Lucas (2007), exploiting the German Socio-Economic Panel and the British Household Panel Study data. The degree of adaptation in the satisfaction on different domains of life has been found to be related to the type of disability (Powdthavee, 2009). An important result in this context has been found by Boyce and Wood (2011), which show that personality traits prior to the onset of illness or disability may influence how well an individual psychologically adjusts after the illness or disability has occurred.

Other studies focus on specific dimensions of life satisfaction. In particular, the socio-economic literature mainly investigates the association between disability and job-satisfaction. Uppal (2005) emphasizes that, after controlling for certain workplace characteristics, individuals with a mobility disability are no longer likely to be less satisfied as compared to individuals without disabilities. This result opens some questions about the role of absence of assistive technology, adaptation and employer accommodations. Malo and Pagán (2009) show that disabled individuals are more likely to be more satisfied in their jobs than non-disabled ones, but only after controlling for some specific variables. This finding could be explained by the lower expectations about jobs of disadvantaged groups.

Social interaction and quality of life and the case of disabled people

The relevance of being included in a social network of relatives and friends on other dimensions of well-being and life satisfaction has been found, amongst other authors, with regards to elderly by Florence (2001) and Sener et al. (2008), and with regards to intellectual disabled persons by Campo, Sharpton, Thompson & Sexton (1997) and by Miller & Chan (2008). Mendes de Leon et al. (1999) show that larger networks have a positive effect on the recovery of disability and on reducing its development.

Quality more than quantity of contacts have been found to positively affect elderly well-being as shown by Sener, Oztop, Doğan and Guven (2008) survey on the impact of interaction with children and grandchildren with elderly. They also show mixed evidence as far as the relationship with siblings is concerned, however they warn about the lack of consideration in the literature of the quality of relationship with siblings. The interaction with adult children can have a negative effect on elderly people well-being when undesired as Silverstein, Chen & Heller (1996) show. Roberto & Husser (2007) by using qualitative interviews to a sample of 58 older women with multiple health problems in the USA show that social relationships act both as resources and as obstacles in the adaptation of women's daily life to their chronic illness problems with contrasting effects on physical health and emotional well-being. Roberto & Husser (2007) show the occurrence of obstacles from social network to the development of older women's well-being when: ‘ ... the

receipt of support deflated the women's sense of self and well-being when the provider of support was not knowledgeable of or sensitive to the intersection of their life values and current needs.' (Roberto & Husser, 2007, p.405).

Though considering different domains of life satisfaction the most negative effect of disability has been found to be on the health dimension, but also a negative impact of disability on individual's satisfaction on social life has been found by to occur (Powdthavee, 2009).

2. Data and descriptive statistics

In order to measure disabled people's well-being we use the 2011 Italian National Statistical Office Survey on Not Self Sufficient Individuals' Social inclusion that collects information in 2011. The survey is directed to people with functional limitations and health problems who live in households and aims to analyse their social integration in everyday life (e.g. at school, at work and during leisure activities) and understands which factors limit their full participation in the society (e.g. lack of access and limitation in mobility). People involved in the survey (through the CATI method, computer assisted telephone interview) are those who stated some functional limitations in a previous survey taken in 2004-2005 ('Health conditions and use of health services survey'). The sample is composed of 3,121 persons between 11 and 87 years old and it should be representative of the 3 million and 947 thousand people of the same age. However, given the particular sampling design, the questionnaire is not aimed at people with limitations risen after the period 2004-2005. Individuals excluded from the analysis are those who passed away in the meanwhile, have been institutionalized, have moved abroad or declared very slight limitations in the preliminary interview in 2011.

Women represent 62% of the sample and, as descriptive statistics in Table 2.1 show, they are on average older than men: women's average age is 72 against 67 for men, and are more likely to be single (43% of them is single and 17% of men). About 40% of interviewees live in the South of Italy and on average their level of education is low (43% of men and 51% of women have as highest education level a primary school certificate) even if, given the age limits (11 to 87 years old), some can be still attending school. About 47% of men and women in the sample do suffer from high level of limitations and 76% of men and 82% of women have chronic diseases, while 48% of men are disabled against 56% of women.

Table 2.1 - Descriptive statistics by gender

	M		F	
Variable	Mean	Std. Dev.	Mean	Std. Dev.
Age	66,62	17,77	71,46	14,52

Single	0,17	0,38	0,43	0,50
North West	0,21	0,41	0,22	0,41
North East	0,18	0,38	0,14	0,35
Centre	0,21	0,41	0,23	0,42
South	0,40	0,49	0,42	0,49
Without Educ.	0,09	0,28	0,18	0,38
Primary	0,43	0,50	0,51	0,50
Secondary	0,27	0,45	0,18	0,38
High School	0,17	0,38	0,10	0,30
Tertiary	0,04	0,19	0,03	0,17
High Lim.	0,46	0,50	0,47	0,50
Medium Lim.	0,33	0,47	0,36	0,48
No limitations	0,21	0,41	0,17	0,37
Chronic disease	0,76	0,43	0,82	0,38
Disabled person	0,48	0,50	0,56	0,50
Weakly disability	0,52	0,50	0,44	0,50
Obs.	1154		1967	

Source: our elaboration based on 2011 ISTAT survey data

As shown in Table 2.1,the average age in the sample is particularly high and this seriously limits the number of observations on potentially active people. As Table 2.2 shows the observations on people aged from 15 to 64 are very low (278 males and 339 females) and amongst those in working age the employment rate is rather low, especially for women: the employment rate for women without limitations is 20%, while for men is72%. If we consider strong limitations, then the employment rate is even lower (less than 10% of women and 32% for men).

We can therefore state that the presence of limitations has a negative effect on individuals' access to work. However the low number of observations of employed people prevent us from carrying out a detailed analysis on the self-perception of employed people about their work.

Table 2.2 - Employment, Activity and Unemployment Rates for people aged 15 to 64 by gender and level of limitations

	No limitations		Medium		High		All	
Variable	M	F	M	F	M	F	M	F
Employed	0,72	0,20	0,52	0,20	0,32	0,10	0,43	0,15
Active	0,72	0,32	0,59	0,27	0,35	0,14	0,47	0,21
Unemployed	0,00	0,12	0,07	0,08	0,03	0,04	0,04	0,06
obs	33	55	77	96	167	186	278	339

Source: our elaboration based on 2011 ISTAT survey data

We focus our analysis on a subsample of individuals aged more than 24 and we analyse the degree of satisfaction in different areas of life-satisfaction (section 4.1) and on social interaction (section 4.2).

Table 2.3 illustrates the distribution of levels of satisfaction among the four domains of life satisfaction analyzed in the first step of analysis. It clearly emerges that while sampled individuals are highly satisfied about relatives relations domain, they are, on average, sufficiently satisfied about friends relations domain, and just little/enough satisfied both in terms of satisfaction about the economic conditions and leisure time.

Table 2.3 Satisfaction levels in four domains of life satisfaction

	Relatives relations		Friends relations		Economic conditions		Leisure time	
Level	Obs.	%	Obs.	%	Obs.	%	Obs.	%
Not at all (= 0)	83	2.83	232	7.94	244	8.35	379	12.98
Little (= 1)	237	8.09	593	20.29	1,426	48.80	1,057	36.20
Sufficiently (= 2)	1,235	42.14	1,297	44.39	1,176	40.25	1,155	39.55
Very (= 3)	1,376	46.95	800	27.38	76	2.60	329	11.27
	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Satisfaction	2.332	0.744	1.912	0.887	1.371	0.673	1.491	0.857

Source: our elaboration based on 2011 ISTAT survey data

To measure social interaction we have used a set of indicators on the level of satisfaction expressed by individuals with regards to their interaction with friends and relatives and on a measure of interaction with friends and relatives connected with individual's judgment on whether the quantity of contacts are as much as they wish, a bit less or much less than they wish. All the variables increase with a positive perception on the quantity and quality of social interaction. The degree of satisfaction is normalized to 1 and the level of interaction takes 4 values (1 much less contact than wished, 4 as much as wished).

As shown in Table 2.4 the level of satisfaction on social interaction decreases the high is the level of limitations, with a steeper decrease for the level of satisfaction for the interaction with friends. Also the interaction with friends and relatives is higher the lower is the level of limitations.

Table 2.4 - Level of satisfaction on interaction with friends and relatives and interaction with friends and relatives by level of limitation and gender for individuals aged more than 24.

	Satisfaction friends		Satisfaction relatives		Interaction friends		Interaction relatives	
Level of lim.	M	F	M	F	M	F	M	F
High	0,67	0,63	0,91	0,84	3,37	3,30	3,50	3,34
Medium	0,86	0,72	0,94	0,84	3,66	3,35	3,59	3,46

None	0,91	0,82	0,95	0,92	3,77	3,70	3,66	3,62
Total	0,79	0,69	0,93	0,85	3,55	3,39	3,57	3,43

Source: our elaboration based on 2011 ISTAT survey data

We can observe the reason that the individual provides for not reaching the desired level of interaction with friends and relatives and web use. When without limitations, men are more likely to state the lack of time, while women are more likely to choose health reasons. With limitations, both men and women find in their health status the reason for the lack of interaction.

Table 2.5 - Reasons why individuals do not reach the desired level of interaction

Limitations	None		Medium		Severe		Total	
Reasons	M	F	M	F	M	F	M	F
Lack of income	6,77	1,18	0	3,68	1,05	0,33	1,61	1,6
No time	30,47	16,74	2,08	12,56	6,39	1,85	8,89	7,64
Lack mobility	5,53	2,39	2,92	1,4	0,18	0,61	1,79	1,71
No company	0	3,38	4,07	2,46	2,35	1,44	2,48	1,98
Health	8,31	25,14	31,98	31,64	45,78	39,86	35,98	35,06
Other	48,92	51,17	58,95	48,26	44,25	55,91	49,25	52,01
	100	100	100	100	100	100	100	100

Source: our elaboration based on 2011 ISTAT survey data

3. Methodology

3.1 The determinants of life satisfaction: an ordered probit model approach

The analysis of the various dimensions of self-reported life satisfaction of disabled people is investigated applying a standard approach. Let be Y_k^* indicate a latent, unobserved variable corresponding to satisfaction, where *k* refers, respectively, to the dimensions: relatives relations (R), friends relations (F), economic situation (E) and leisure time (L). This indicator is assumed to depend linearly on a set of exogenous characteristics X_K, such as:

(1) $Y_k^* = f(X_k)$

However, since the latent variable is unobservable, we rely on information from our survey that provides information on an ordered indicator, Y_k. More formally:

(2) $Y_{ik} = \beta_k' X_k + \varepsilon_{ik}$

where β is a vector of unknown parameters to be estimated, ε_k is the error term and, finally:

$$(3)\ Y_{ik} = \begin{cases} 1 \text{ if } Y_k^* \leq \mu_{k1} \\ 2 \text{ if } \mu_{k1} < Y_k^* \leq \mu_{k2} \\ 3 \text{ if } \mu_{k2} < Y_k^* \leq \mu_{k3} \\ 4 \text{ if } Y_k^* > \mu_{k3} \end{cases}$$

and μ_{k1}, μ_{k2}, μ_{k3}, are a set of threshold parameters to estimate. Under the normality assumption of the residual ε_k, the corresponding model is a standard ordered probit specification.

The set of covariates *X* includes control variables commonly used in the analysis of individual satisfaction, like age, gender, area of residence, educational level, household size, household type, health condition and chronic conditions, and labour market status. Other covariates directly refer to disability. Specifically, we control for the severity of disability (weak or strong), the type of disability according to the three categories, that refer to the type of difficulty, provided by our dataset: difficulties in seeing, hearing and/or speaking, difficulties in movements and difficulties in personal care and, finally, if the individual may benefit of help by friends or relatives. We control for the role of participation in associations, organizations or voluntary groups and the role of reading books: both variables should proxy the role of participation in social and cultural activities. Finally, we control for a set of dummy variables indicating the role of specific activities, like meeting relatives or friends, sport activities, religious activities, frequenting theatres or visiting museums, and if investigated individuals are subjected to involuntary limitations in making those activities.

Because of the cross-sectional nature of our dataset a potentially relevant issue remains unexplored, i.e. the existence of unobservable factors driving the satisfaction of disabled individuals. Even though we are unable to directly handle the unobservable heterogeneity issue, we can test if the k-dimensions of life satisfactions are affected by common unobservable factors.

3.2 The role of unobservable factors: a multivariate probit model approach

To test the presence of unobservable factors that simultaneously affect the various dimensions of life satisfaction, we adopt a multivariate probit model, for which k probit models are simultaneously

estimated and the correlation among their respective error terms is estimated[2]. The magnitude and the significance of the correlation terms may reveal the presence of underlying unobservable variables driving the satisfaction outcomes.

To adopt a MV probit model the ordinal responses used in the ordered probit models must be collapsed in binary variables. Specifically, ordinal responses corresponding to "very" and "enough" satisfied are collapsed in "satisfied", while "few" and "not at all" satisfied are collapsed "is not satisfied". The resulting binary response variable (Z) takes value one if the latent variable Z^* is greater than zero. It follows that each individual we estimate:

$$(4)\ Z_{iR} = X_R'\gamma_R + \nu_{iR} \qquad \text{where} \qquad Z_{iR} = \begin{cases} 1 \text{ if } Z^*_{iR} > 0 \\ 0 \text{ otherwise} \end{cases}$$

$$(5)\ Z_{iF} = X_F'\gamma_F + \nu_{iF} \qquad \text{where} \qquad Z_{iF} = \begin{cases} 1 \text{ if } Z^*_{iF} > 0 \\ 0 \text{ otherwise} \end{cases}$$

$$(6)\ Z_{iE} = X_E'\gamma_E + \nu_{iE} \qquad \text{where} \qquad Z_{iE} = \begin{cases} 1 \text{ if } Z^*_{iE} > 0 \\ 0 \text{ otherwise} \end{cases}$$

$$(7)\ Z_{iL} = X_L'\gamma_L + \nu_{iL} \qquad \text{where} \qquad Z_{iL} = \begin{cases} 1 \text{ if } Z^*_{iL} > 0 \\ 0 \text{ otherwise} \end{cases}$$

where X_k is the matrix of covariates identical among individuals, γ_k is a vector of unknown parameters to be estimated and v_k is an error term. Besides:

$$(8)\ E[\nu_{iR}] = E[\nu_{iF}] = E[\nu_{iE}] = E[\nu_{iL}] = 0$$

$$(9)\ Var[\nu_{iR}] = Var[\nu_{iF}] = Var[\nu_{iE}] = Var[\nu_{iL}] = 1$$

$$(10)\quad Cov[\nu_{iR}, \nu_{iF}] = \rho_{RF;} Cov[\nu_{iR}, \nu_{iE}] = \rho_{RE;} Cov[\nu_{iR}, \nu_{iL}] = \rho_{RL}$$
$$Cov[\nu_{iF}, \nu_{iE}] = \rho_{FE;} Cov[\nu_{iF}, \nu_{iL}] = \rho_{FL;} Cov[\nu_{iE}, \nu_{iL}] = \rho_{EL}$$

[2] We also run an independent Probit model for each dimension analyzed here and compare the estimated coefficients obtained by the MVprobit model (Table A1) with those obtained by the 4 Probit models (Table A2). This allows to assess the differences in the magnitude of the estimated coefficients controlling or not for the presence of unobservable factors.

Assuming normally distributed additive stochastic terms, each individual probability of being satisfied can be modeled as a probit equation in which the probability of being satisfied is explained by exogenous variables that affect individual satisfaction. In order to control for unobservable factors which may determine some correlation in the residuals of the estimated equations and to provide unbiased and consistent estimates, a multivariate (MV) joint probit approach is applied. The model is estimated using a simulated maximum likelihood (SML) estimator (specifically, the Geweke-Hajivassiliou-Keane (GHK) simulator is used) which, under standard conditions is consistent as the number of observations and the number of draws tend to infinity, and is asymptotically equivalent to the true maximum likelihood estimator as the ratio of the square root of the sample size to the number of draws tends to zero (Cappellari and Jenkins, 2003).

3.3 The MIMIC model

Our empirical model on social interaction assumes that this concept can be interpreted as a latent factor, which manifest itself though a set of observed indicators. In this paper we propose to use different available indicators simultaneously to study the level of social interaction for people with disability, through a MIMIC (multiple indicators multiple causes) model.

As this model is an extension to the factor analysis setting, we briefly introduce the notations through the factory analysis model. The MIMIC model, proposed by Joreskog and Goldberger (1975), can be represented as follows:

(11) $y_i = \Lambda f_i + \varepsilon_i$ Measurement Equations

(12) $f_i = Bxi + \nu_i$ Causal Relationships

with $V(\varepsilon_i) = \psi$ and $V(\nu_i) = \sigma^2 I_m$, and where f_i(m x1) is a vector of latent factors of individual *i* (m = number of latent dimensions), y_i(k x1) is a vector of observed indicators (k = number of indicators), x_i(nx1) is a vector of latent exogenous variables (n = number of exogenous variables), and Λ and B are corresponding coefficient matrices.

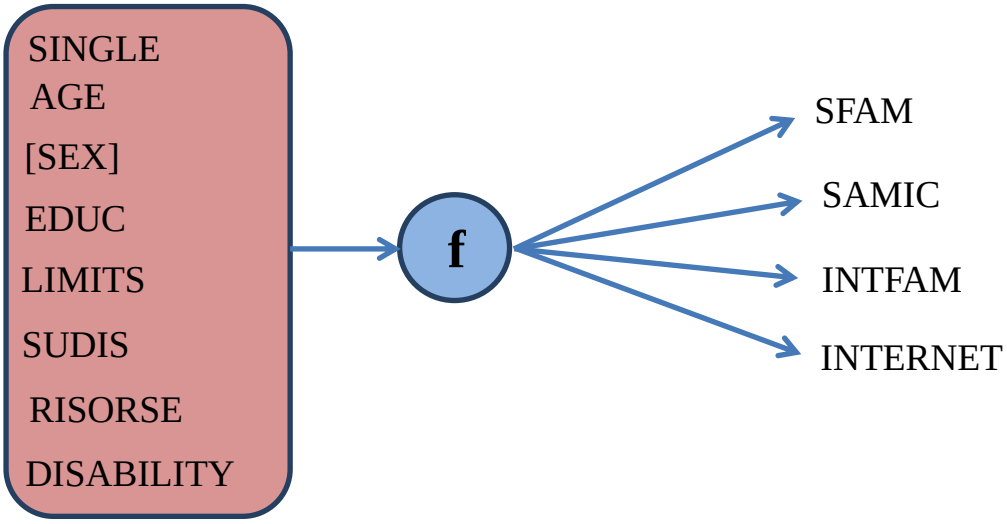
The measurement equations show that latent factors manifest themselves through some observed variables, while the causal relationships show the influence of exogenous variables on the latent factors. The disturbance terms (ε_i and ν_i) are assumed to have zero means and to be not correlated with one another. For each indicator representing the latent construct, a weight (i.e. a factor loading)

is estimated. The factor loading represents how much, compared to the others, the indicator counts in explaining the latent variable[3].

In this paper, the MIMIC model has one latent factor, called 'social interaction', explained by a number of indicators. The indicators included are one variable on the degree of interaction with relatives, two variables on the satisfaction of the individual towards his/her relationship with friends and relatives, and one variable on internet use.

Furthermore, the MIMIC model allows to consider that the latent factor is also caused by exogenous variables (x_i), among which we select variables concerning age, sex[4], civil status, education level, place of residence, degree of limitation in daily activities, the presence of a disability and the evaluation of the economic situation of the family. Figure 3.1 represents the MIMIC model proposed:

Figure 3.1 MIMIC model on social interaction



As showed in Figure 3.1,the right hand side of the figure corresponds to a factor analysis, while the full diagram reports a full MIMIC model with exogenous variables (covariates). Given that the model presents categorical indicators, we use the robust weighted least squares estimator (WLSMV).

[3] For a detailed review of the model, see Aigner et al. (1984) and Zellne (1970). For an application, see Krishnakumar et al. (2011), where is analysed the concept of social policy; Addabbo and Di Tommaso (2011), where are analysed 'senses, imagination and thought' and 'leisure activities, play' for Italian children; and Di Tommaso (2007), where is conceptualized children's well-being for India.

[4] In a variant of the model, we do not insert the variable "sex" in the left side (among the exogenous variables), but we estimate the model for men and women separately.

4 Results

4.1 The determinants of life satisfaction

The analysis of the determinants of the four dimensions of life satisfaction of Italian disabled people is carried out by applying both an ordered probit model and a multivariate probit model. Estimation results from the first application are reported in Tables 4.1.1a – 4.1.1d. For what concern the multivariate probit results, instead, Only the estimation of the correlation terms across life satisfaction dimensions is reported (Table 4.1.2)[5].

For each dimension analyzed, we control for standard variables, like personal and household characteristics (age, gender, area of residence, household size and household type), civil status (being married or cohabitant) socially developed characteristics (education and health), and time allocation (membership in organizations and reading books). Moreover, we use dummy variables to take into account the perceived economic situation, except that in the economic condition domain. Another set of controls are disability-specific. Some of them are aimed at considering the severity and the type of disability, while a set of dummy variables describes the degree of limitation in daily activities, allowing to control the effect of the interaction between disability condition, external environment and technical supports. Moreover, we introduce two dummy variables to control for the role of being supported by relatives or other individuals. Finally, we include a wide set of covariates, controlling for being interested or not in doing specific activities and, if interested, the satisfaction about the frequency in doing those activities (enough, not enough, not at all). Activities include those concerning relationships (seeing relatives and friends) and time allocation (exercise/sport activities, religious activities and cultural activities – e.g. attending theatres and visiting museums).

Because some relevant factors are not controlled for in our cross-sectional dataset, we run a multivariate probit model to investigate the presence and the significance of common unobservable factors (e.g. personality) affecting the dimensions analyzed here.

Tables 4.1.1a, 4.1.1b, 4.1.1c and 4.1.1d, report both coefficients and the marginal effects for each covariate for the relatives' relations, the friends relations, the economic conditions and the leisure time domains respectively. Our results description is focused on (statistically significant) estimated coefficients, even though marginal effects are also reported with the aim of providing supports for a deeper comprehension of the association between covariates and response variables.

[5] Estimations of covariates from the MV probit model are reported in the Appendix (Table A1). As can be noted some differences emerges with respect to the magnitude of estimations in the ordered probit model. This can be attributed to the different categorization of the response variable. When comparing MV probit with standard probit estimations, differences in estimated coefficients are smaller.

With respect to the age variable we find that disabled people aged more than 65 are more satisfied than younger groups (the effect is not significant for the leisure time domain). The positive effect is weaker for what concerns the satisfaction with friends, while it is particularly strong for the economic condition domain. This result partly agrees with the standard age U-shaped effect found by researchers focusing on well-being and life satisfaction of the whole population. In addition, we find a significant and strong positive effect from being supported by relatives and/or other individuals. Interestingly, being supported by relatives does not increase the satisfaction with relatives' relations but, rather, being supported by other people especially increases the satisfaction with relatives, while being supported by relatives especially increases the satisfaction with friends relations. This finding, quite new in the literature, is suggestive of the relevance of support for disabled people both for developing activities, but also for the satisfaction in doing those activities.

Other variables affect, in turn, some dimensions, but not others. For example, being male increases the satisfaction with economic situation and leisure time. This finding disagrees with those studies reporting higher happiness for women. However, it could be explained arguing that it is easy to observe greater difficulties or (economic) discrimination toward female disabled people, also because of an association with the age variable. A positive effect is guaranteed by the household size on satisfaction with relatives and friends relations and the economic situation. This could be view as an effect of association between household size with marital status and/or presence of children, as well as the possibility of being supported when needed, that usually positively affects life satisfaction. A quite surprising result is the higher satisfaction with relatives relations for the household type "mother single-parent" and with friends relations for the household type "father single-parent". Conversely, it would be expected the negative relationship between "being mother single-parent" and being less satisfied with economic conditions. From a territorial point of view, we find a weak duality North/South on the satisfaction with relatives relations and leisure time. Being low educated reduces the satisfaction with economic conditions. This finding is consistent with some previous results and it is possibly due to the correlation between educational level and income perspectives. An economic variable has been introduced to *proxy* the income effect. The only information contained in the dataset concerns the adequacy or not of the economic resources and it has not been introduced as a control variable in the dimension "economic situation" because of the risk of endogeneity. We find that scarce economic resources negatively affect the satisfaction with leisure time.

If we focus on disability/health variables, we find that, consistently with the literature, being in a good health status increases the satisfaction with relatives and friends relations and economic situation dimensions, while being in bad health status decreases the satisfaction in all dimensions

analyzed. Conversely, quite unexpected is the negative impact of being weakly disabled on satisfaction with relatives relations, while the negative impact on satisfaction with economic conditions could be explained with the possibility of receiving disability benefits for strongly disabled people. Finally, being severely limited in daily activities negatively affects the satisfaction with leisure time and with friends relations. The type of disability affects satisfaction with the leisure time domain and, in particular, Having a sensorial disability or a self-care disability decrease the satisfaction when compared to mobility disability. Finally, we find no effect from being members of organizations (e.g. voluntary associations), while a positive effect of reading books is found for satisfaction with leisure time. This could indicate that having specific interests/hobbies may help in improving some dimensions of life satisfaction.

When we focus on the role of specific activities, all estimated coefficients refer to the base-category "he/she does not do this activity and he/she is not interested in doing it" (that could be resumed as "do not like this specific activity").

The degree of satisfaction with relatives' relations is higher for those disabled people that like to meet relatives and are able to do it enough. A similar effect is attached to exercise/sport activities, that it has been found (according to previous studies) to reduce the risk of depressive symptoms especially among over 60s. Being interested in religious activities but being impeded in doing them, reduces the satisfaction with relative relations, possibly signalling the negative effect derived from limitations in doing activities. A positive relationship is found between being interested in attending theatres but being impeded in doing it and satisfaction with relations with relatives. This result could suggest that being interested in cultural activities, apart from the possibility of doing it, increases life satisfaction. Finally, an unexpected negative effect is found for those disabled people that are interested and visit enough museums, while quite expected is found a negative effect for those individuals interested in visiting museums but impeded in doing it. This can be interpreted, once more, as a *proxy* of limitations in doing activities.

For what concerns the satisfaction with friends' relations, we find that being interested in meeting friends, and doing it enough or less than enough, increases the satisfaction with this dimension. Being interested in doing exercise/sport activities and doing them enough increases the satisfaction with friends' relations. A similar effect is found for those interested in religious activities but doing them less than wished.

The satisfaction with the economic situation is just affected by being interested in attending theatres and visiting museums and could be seen as *proxies* of personality.

The satisfaction with leisure time is, as expected, affected by these activities. Being interested in meeting friends (and doing it as wished) and practice exercise/sport activities (and doing them less

than wished) increase the satisfaction with leisure time. A positive effect is also found for being interested in religious activities, independently of the degree of participation. Finally, being interested in attending theatres (but being impeded in doing it) unexpectedly increases the satisfaction with leisure time, while a similar positive effect is found for disabled people interested in visiting museum and doing it less than enough. In both cases, these results suggest that being interested in cultural activities is preferable to not being interested in terms of achieved satisfaction. In other terms, they could *proxy* the effect of personality.

[Tables 4.1.1a/b/c/d about here]

Table 4.1.2 presents the correlation among the error terms of the analyzed satisfaction dimensions. On the one side we find that whatever couple of dimensions (and model specification) is considered we found that correlation exists and it is significant at 1% level. On the other side, the magnitude of the correlations diverge across couple of dimensions and tend to be weak or moderate. It is moderate for dimensions strictly related with social interactions like relatives and friends relations (0.387), and for economic conditions and leisure time (0.302), while it is weak for other couples (from 0.231 for the F-L combination to 0.104 for the R-L combination). This is suggestive that unobservable factors commonly affect the satisfaction levels of various dimensions analyzed here, even though this effect is relatively small in magnitude. Among unobserved common factors, we could include personality traits, as well as other specific cognitive and non-cognitive skills that usually drive life outcomes of individuals. This could be explicative, for example, of the smaller correlation between relatives relations and economic situation and relatives relations and leisure time, possibly because personality traits involved in those respective dimensions are less connected than those involved in the former case. Moreover, the joint LR-test of zero correlation among different dimensions is strongly rejected (Table 4.1.3). Finally, a possible further consequence of the relatively small correlation among unobserved terms is the restrained differences among estimated coefficients of the MVprobit (Table A1) and those of the Probit models (Table A2). This is quite reassuring for the reliability of our estimates. In fact, even though unobservable heterogeneity exists, the potential bias deriving from a fail in controlling for it is, all in all, quite small.

Table 4.1.2 Correlation among error terms

Dimension	R	F	E
F	**0.387**		
	0.039		
E	**0.117**	**0.153**	
	0.037	*0.034*	
L	**0.104**	**0.231**	**0.302**
	0.036	*0.032*	*0.030*

Source: our elaboration based on 2011 ISTAT survey data

Table 4.1.3. LR-tests for joint correlation among error-terms

ρRF=ρPE=ρPL=ρFE=ρFL=ρEL=0	chi2(6)	
	254.08	***

Source: our elaboration based on 2011 ISTAT survey data

4.2 Social interaction and its determinants

Social interaction is a relevant, though not directly observed, dimension of individual well-being. We have therefore tried to measure it as a latent variable by estimating a MIMIC model, described in Section 3.2, where the indicators of the latent variable are:

- level of satisfaction on the interaction with relatives (categorical variable with 4 categories);
- level of satisfaction on the interaction with friends (categorical variable with 4 categories);
- interaction with relatives (dummy variable)[6];
- frequency of internet use and satisfaction on that (categorical variable with 3 categories).

The level of the indicators increase with a positive perception on the quality/quantity of social interaction.

Amongst the factors that can affect its conversion into observable functionings or its very development we include:

- personal characteristics: sex, age, level of education (measured by years of education), degree of limitations[7], presence of disabilities;
- family characteristics: perception on the economic condition of the family;
- area of residence: South with respect to Centre/North;
- living arrangement: whether he/she is single with respect to other living arrangements.

[6] Due to the strong correlation (0.93) between the two indicators on the degree of interaction with friends and on the degree of interaction with relatives, we introduce in the model only one of them (i.e. interaction with relatives).

[7] Higher values of this variable indicates less limits.

The model has been estimated on the whole sample of people aged over 24. The fit of the model is measured by CFI, TLI and RMSEA and can be considered satisfying[8]. The indicators chosen for explaining the latent factor are all significant. The one that has the highest weight in the measurement of the unobserved dimension of social interaction is the degree of interaction with relatives (INTFAM) followed by the frequency and satisfaction on the use of internet (INTERNET) and by the level of satisfaction on interaction with friends (SAMIC) and with relatives (SFAM).
Turning to the effect of individual conversion factors we can see how age decreases social interaction and how women have a low level of social interaction. Education does not affect significantly social interaction. In addition, consistently with the literature the degree of limitations of the individual does significantly affect social interaction with an effect that increases with the severity of limitations. Similarly, the presence of a disability contributes negatively to the level of social interaction. Turning to family type, being single reduces social interaction, while living in the South/Islands of Italy does not affect it. A higher level of perceived family monetary well-being has a positive effect on individual's social interaction. This is consistent with the positive effect of income on life satisfaction through its effect on social participation found by Rijken & Groenewegen (2008) in their applied analysis on 1,265 patients diagnosed with one or more somatic chronic disease in the Netherlands.

Table 4.2.1 - Estimation of MIMIC on social interaction whole sample (aged over 24)

TESTS OF MODEL FIT

```
CFI/TLI

          CFI                                0.891
          TLI                                0.855

Number of Free Parameters                       12

RMSEA (Root Mean Square Error Of Approximation)

          Estimate                           0.063
```

[8] To assess the fit of the model, we look at the Root Mean Squared Error of Approximation (RMSEA), which is an absolute fit index. According to Daire Hooper and Mullen (2008), RMSEA cut-off points have been reduced during years. At the beginning only values higher than 0.10 indicated poor fit, after that RMSEA between 0.08 and 0.10 was considered a mediocre fit, while below 0.08 a good fit. However, more recently, a limit of 0.06 or 0.07 seems to be the general cut-off accepted among experts.
In contrast, incremental fit indices, such as the Tucker-Lewis Index (TLI) and the Bentler's Comparative Fit Index (CFI) compare a target model with a restricted, nested and baseline (i.e. with all the observed variables uncorrelated one another) one. For both these indices, values next to 1 are preferable.
For an overview of the cut-off criteria for different fit indices, see Hu and Bentler (1999).

MODEL RESULTS

	Estimates	S.E.	Est./S.E.	Std	StdYX
F1 BY					
SAMIC	1.000	0.000	0.000	0.795	0.622
SFAM	0.808	0.086	9.345	0.642	0.540
INTFAM	2.238	0.278	8.041	1.779	0.872
INTERNET	1.333	0.117	11.394	1.059	0.727
F1 ON					
SEX	-0.181	0.042	-4.289	-0.227	-0.110
SINGLE	-0.105	0.042	-2.494	-0.132	-0.062
AGE	-0.009	0.002	-5.283	-0.011	-0.133
SUDIS	0.002	0.038	0.046	0.002	0.001
RISORSE	0.234	0.041	5.743	0.294	0.146
EDUC	0.006	0.005	1.279	0.008	0.031
DISABLE	-0.251	0.045	-5.604	-0.315	-0.157
LIMITS	0.236	0.033	7.232	0.297	0.222

To corroborate our results, we estimate the model by gender to take into account the different impact of the same conversion factors on social interaction on men and women (Table 4.2.2).

Again according to CFI, TLI and RMSEA tests the model shows a good fit. For both men and women the interaction with relatives has the highest weight in the measurement of social interaction. However satisfaction in the interaction with friends has a higher weight for men than for women, whereas satisfaction in the interaction with relatives has a higher weight for women.

Having as much as wished level of interaction via web is a relevant dimension in the measurement of social interaction.

Comparing the effect of the same variables on social interaction by gender we can see that being single significantly reduces social interaction only for women. Age reduces social interaction for both men and women whereas being more educated significantly increases social interaction only for men having a not significant negative effect for women.

The area of residence does not significantly affect social interaction that increases instead both for men and for women the higher is the perceived level of monetary well-being of the family (RISORSE). The latter effect is higher for women than for men. Finally, both men and women's social interaction is negatively affected by limitations and by disability. The latter effect being more relevant for men than for women.

Table 4.2.2 - Social interaction by gender results of MIMIC model on individuals aged over 24

TESTS OF MODEL FIT

CFI/TLI

CFI	0.905
TLI	0.864

RMSEA (Root Mean Square Error Of Approximation)

Estimate	0.065	

MODEL RESULTS

	Estimates	S.E.	Est./S.E.	Std	StdYX
Group MALE					
F1 BY					
SAMIC	1.000	0.000	0.000	0.920	0.677
SFAM	0.586	0.125	4.689	0.539	0.474
INTFAM	1.783	0.337	5.293	1.641	0.854
INTERNET	1.070	0.143	7.475	0.984	0.701
F1 ON					
SINGLE	-0.072	0.091	-0.794	-0.079	-0.030
AGE	-0.013	0.003	-4.412	-0.015	-0.190
SUDIS	-0.081	0.074	-1.101	-0.089	-0.044
RISORSE	0.147	0.079	1.872	0.160	0.078
EDUC	0.022	0.009	2.417	0.024	0.094
DISABLE	-0.460	0.095	-4.862	-0.500	-0.249
LIMITS	0.298	0.063	4.698	0.324	0.246
Group **FEMALE**					
Group FEMALE					
F1 BY					
SAMIC	1.000	0.000	0.000	1.099	0.587
SFAM	0.586	0.125	4.689	0.643	0.556
INTFAM	1.783	0.337	5.293	1.959	0.885
INTERNET	1.070	0.143	7.475	1.175	0.729
F1 ON					
SINGLE	-0.193	0.078	-2.477	-0.176	-0.087
AGE	-0.010	0.003	-2.779	-0.009	-0.097
SUDIS	0.054	0.067	0.797	0.049	0.024
RISORSE	0.402	0.095	4.237	0.366	0.183
EDUC	-0.001	0.009	-0.112	-0.001	-0.004
DISABLE	-0.247	0.086	-2.870	-0.224	-0.111
LIMITS	0.327	0.077	4.243	0.297	0.219

5. Conclusions

This paper analyzes life satisfaction of disabled people in Italy, focusing on people with functional limitations and health problems who live in households, as provided by the 2011 ISTAT survey.

The analysis is twofold. In a first step we, first, focus on the predictors of four specific domains of life satisfaction of sampled individuals: satisfaction with relatives relations, friends relations, economic conditions and leisure time; and second, we analyze the presence of unobservable factors jointly affecting the four satisfaction domains. In a second step, we analyze the relevance in individual well-being of social interaction, applying a MIMIC model which treats it as a latent factor manifesting itself through a number of observed indicators and adding also exogenous variables.

Evidence emerged from the ordered probit model, tend to confirm the standard age U-shaped effect on life satisfaction, as well as some effects from being low educated or regional disparities. A relevant finding concerns the positive role of being supported on many domains of life satisfaction. Health status is confirmed to be a relevant predictor of life satisfaction, especially when we are focusing on people with functional limitations. Being severely limited in daily activities negatively affects the satisfaction with leisure time, while different types of disability also produce heterogeneous effect on this specific domain of life satisfaction. Importantly, our findings suggest that specific daily activities (meeting relatives and friends, sport, religious and cultural activities) may be relevant in affecting different domains of life satisfaction. In particular, sports and religion activities tend to increase life satisfaction, especially when there are little or no limitations. Not being impeded in meeting relatives and friends is important in defining those specific domains of life satisfaction while, for what concerns cultural activities (e.g. attending theatre and visiting museums), it seems important the interests toward those activities rather than the degree of limitation. Finally, according to the MV probit analysis, we find evidence that unobservable factors commonly affect various domains of life satisfaction analyzed. This could be suggestive of a role played by unobservable factors, like personality traits or other specific cognitive and non-cognitive skills that usually drive life outcomes of individuals.

For what concerns the second step of our analysis, social interaction is interpreted as a crucial dimension of individual well-being. For measuring this dimension, we use observable indicators on the degree of interaction with friends and relatives and the use of web by estimating a MIMIC model. Results show that women have a lower achievement in social interaction and that they are more negatively affected if single or if they live in a family with a perceived lower level of economic resources. Both men and women's social interaction is lower with limitations and disability though the effect of disability is much more relevant for men than for women.

In terms of policies dedicated to disabled people the evidence shown on social interaction would suggest to invest also in policies able to increase their level of social interaction. Given the increasing number of elderly single women and the higher likelihood of living in poverty faced by elderly women in Italy, policies dedicated to increase their income sustainability can have a positive effect on social interaction, which is a crucial dimension of well-being that they are more likely to be deprived of.

References

Addabbo, Tindara, and Maria Laura Di Tommaso (2011) "Children Capabilities and Family Characteristics in Italy: Measuring Imagination and Play". In *Children and the Capability Approach*, ed. M. Biggeri, J. Ballet, and F. Comim (New York, Palgrave Macmillan).

Aigner, Dennis J., Cheng Hsiao, Arie Kapteyn, and Tom Wansbeek (1984) "Latent variable models in econometrics". In *Handbook in Econometrics*, ed. Z. Griliches and M.D. Intriligator, vol. 2 (North Holland, Amsterdam) pp. 1323-1393.

Blanchflower and Oswald (2008) "Is well-being U-shaped over the life cycle?", *Social Science and Medicine*, Vol. 66(8): 1733-1749.

Boyce C.J., Wood A.M. (2011) "Personality Prior to Disability Determines Adaptation: Agreeable Individuals Recover Lost Life Satisfaction Faster and More Completely", *Psychological Science*, Vol. 22(11): 1397–1402.

Campo S. F., Sharpton W. R., Thompson B. & Sexton D. (1997) "Correlates of the quality of life of adults with severe or profound mental retardation". *Mental Retardation* 35, 329–37

Cappellari, L., S.P. Jenkins (2003) "Multivariate probit regression using simulated maximum likelihood". *The Stata Journal*, Vol. 3(3): 278-294.

Conceição P., Bandura R. (2008) "Measuring subjective wellbeing: A summary review of the literature". United Nations Development Programme (UNDP) Development Studies, Working Paper.

Daire Hooper, Joseph Coughlan, and Michael R. Mullen (2008) "Structural Equation Modelling: Guidelines for Determining Model Fit". *The Electronic Journal of Business Research Methods* 6(1), 53-60.

Di Tommaso, Maria Laura (2007) "Children capabilities: A structural equation model for India". *The Journal of Socio-Economics* (36), 436-450.

Dolan P., Peasgood T., White M. (2008) "Do we really know what makes us happy? A review of the economics literature on the factors associated with subjective well-being", *Journal of Economic Psychology*, Vol. 29: 94-122.

Easterlin R. (2006) "Life cycle happiness and its sources. Intersection of psychology, economics and demography", *Journal of Economic Psychology*, Vol. 27: 35-47.

Freedman V.A., Stafford F., Schwarz N., Conrad F., Cornman J.C. (2012) "Disability, participation, and subjective wellbeing among older couples", *Social Science and Medicine*, Vol. 74(4): 588-596.

Grant K.R., Chappell N.L. (1983) "What is reasonable is true : Life satisfaction and functional disability among day hospital participants", *Social Science and Medicine* vol. 17(2), 71-78.

Haybron D.M. (2005). Life satisfaction, ethical reflection and the science of happiness. *Journal of Happiness Studies*, 8, 99-138.

Hu, Litze, and Peter M. Bentler (1999) "Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives". *Structural Equation Modeling: A Multidisciplinary Journal* 6(1): 1-55.

Jang Y. et al. (2004) "The Role of Social Engagement in Life Satisfaction: Its Significance among Older Individuals with Disease and Disability". *Journal of Applied Gerontology*, vol. 23 (3) 266-278

Joreskog, Karl G., and Arthur S. Goldberger (1975) "Estimation of a Model with Multiple Indicators and Multiple Causes of a Single Latent Variable". *Journal of the American Statistical Association* 70(351), 631-639.

Krishnakumar, Jaya, Paola Ballon, and Juan Tellez (2011) "Modelling Social Policy". In *Development and Public Finance*: Essays in Honour of Raja J. Chelliah, ed. U. Sankar and D.K. Srivastava (Sage publications, New Delhi, India).

Lucas, R. (2007) "Long-term disability is associated with lasting changes in subjective well-being: evidence from two national representative longitudinal studies". *J. Pers. Soc. Psychol*. 92(4), 717–780.

Lucas-Carrasco R., Salavador-Carulla L. (2012) "Life satisfaction in persons with intellectual disabilities". *Research in Developmental Disabilities,* 33(4):1103-9

Kinney W.B., Coyle C.P. (1992) "Predicting life satisfaction among adults with physical disabilities". *Archives of Physical Medicine Rehabilitation,* vol. 73(9): 863-9.

Mailhan L. Azouvi P., Dazord A. (2005) "Life satisfaction and disability after severe traumatic brain injury". *Brain Injury*, Vol. 19(4) : Pages 227-238

Mendes de Leon, C. F., Glass, T. A., Beckett, L. A., Seeman, T. E., Evans, D. A., & Berkman, L. F. (1999) "Social networks and disability transitions across eight intervals of early data in the New Haven EPESE". *Journal of Gerontology: Social Sciences*, 54, S162–S172.

Menhert, T., Krauss, H.H., Nadler, R. and Boyd, M. (1990) "Correlates of life satisfaction in those with disabling conditions". *Rehabilitation Psychology*, 1990, 35, 3-17.

Miller S.M. & F. Chan (2008) "Life satisfaction and intellectual disabilities", *Journal of Intellectual Disability Research* volume 52 part 12 pp 1039–1047.

Mollaoğlu et al. (2010) "Mobility disability and life satisfaction in elderly people". *Archives of Gerontology and Geriatrics*, vol. 51 (2010) e115–e119

Nosek M.A. et al (1995) "Life satisfaction of people with physical disabilities: Relationship to personal assistance, disability status, and handicap". *Rehabilitation Psychology*, vol. 40 (3), 1995, 191-202.

OECD (2012) "OECD Better Life Index", http://www.oecdbetterlifeindex.org/

Osberg et al. (1987) "Life Satisfaction and Quality of Life Among Disabled Elderly Adults" *Journal Gerontology*, vol. 42 (2): 228-230.

Oswald, A., Powdthavee, N. (2008) "Does happiness adapt? A longitudinal study of disability with implications for economists and judges". *J. Public Econ.* 92, 1061–1077.

Pagán-Rodríguez, Ricardo (2010) "Onset of disability and life satisfaction: evidence from the German Socio-Economic Panel", *The European Journal of Health Economics* 11:471–485

Pagán-Rodríguez R., Malo M. (2009) "Job satisfaction and disability: lower expectations about jobs or a matter of health?" *Spanish Economic Review*, Vol.11(1): 51-74

Powdthavee, Nattavudh (2009) "What happens to people before and after disability? Focusing effects, lead effects, and adaptation in different areas of life", *Social Science & Medicine* 69, 1834–1844.

Riis J., Loewenstein G., Baron J., & Jepson C. (2005) "Ignorance of hedonic adaptation to hemodialysis: A study using ecological momentary assessment". *Journal of Experimental Psychology: General*, 134 (1), 3-9.

Rijken, M. & Groenewegen, P.P. (2008) "Money Does Not Bring Well-Being, but It Does Help! The Relationship between Financial Resources and Life Satisfaction of the Chronically Ill Mediated by Social Deprivation and Loneliness", *Journal of Community & Applied Social Psychology*, 18: 39–53.

Roberto Karen.A, & Erica K. Husser (2007) "Social relationships: resources and obstacles to older women's health adaptations and well-being", *Interpersonal Relations Across the Life Course. Advances in Life Course Research*, Volume 12, 383–410

Schwartz C., Rabinovitz S. (2003) "Life satisfaction of people with intellectual disability living in community residences: perceptions of the residents, their parents and staff members", *Journal of Intellectual Disability Research*, vol. 47, 75-84

Sener, Arzu; Oztop, Hulya; Doğan, Nuri; Guven, Seval (2008) "Family, Close relatives, friends: life satisfaction among older people", *Educational Gerontology*. Oct2008, Vol. 34 Issue 10, p890-906.

Silverstein, M., Chen, X., & Heller, K. (1996). "Too much of a good thing? Intergenerational support and well-being". *Journal of Marriage and the Family*, 58, 970–982.

Uppal S., (2005) “Disability, workplace characteristics and job satisfaction”, International Journal of Manpower, Vol. 26(4): 336 - 349

Zellner, Arnold (1970) “Estimation of Regression Relationships Containing Unobservable Independent Variables”. *International Economic Review* 11(3), 441-54.

Table 4.1.1a Ordered probit model estimates: satisfaction with relatives' relations

				Marginal effects			
	Coefficient	Robust S.E.		Not at all	Little	Sufficiently	Very
Aged less than 35	0.109	0.214		-0.006	-0.013	-0.022	0.041
Aged 51-65	0.073	0.115		-0.004	-0.008	-0.015	0.027
Aged more than 65	0.221	0.112	**	-0.013	-0.026	-0.044	0.082
Male	0.026	0.049		-0.002	-0.003	-0.005	0.010
Household size	0.111	0.028	***	-0.006	-0.013	-0.022	0.041
North-West	0.075	0.073		-0.004	-0.009	-0.015	0.028
North-East	0.019	0.075		-0.001	-0.002	-0.004	0.007
South-Islands	-0.118	0.060	**	0.007	0.014	0.023	-0.044
Low education	0.001	0.072		0.000	0.000	0.000	0.000
High education	-0.032	0.134		0.002	0.004	0.006	-0.012
Household type: couple with children	0.116	0.164		-0.007	-0.013	-0.023	0.043
Household type: couple without children	0.211	0.158		-0.012	-0.024	-0.042	0.078
Household type: father single-parent	0.310	0.226		-0.018	-0.036	-0.062	0.115
Household type: mother single-parent	0.256	0.103	**	-0.015	-0.030	-0.051	0.095
Married/Cohabitant	0.029	0.153		-0.002	-0.003	-0.006	0.011
Being supported by familiar	0.052	0.046		-0.003	-0.006	-0.010	0.019
Being supported by others	0.511	0.071	***	-0.029	-0.059	-0.102	0.190
Adequate economic resources	-0.074	0.188		0.004	0.009	0.015	-0.027
Scarce economic resources	-0.155	0.191		0.009	0.018	0.031	-0.058
Insufficient economic resources	-0.124	0.216		0.007	0.014	0.025	-0.046
Good health	0.207	0.079	***	-0.012	-0.024	-0.041	0.077
Bad health	-0.182	0.053	***	0.010	0.021	0.036	-0.068
Chronic conditions	0.071	0.070		-0.004	-0.008	-0.014	0.027
Severe limitations in daily activities	-0.002	0.055		0.000	0.000	0.000	-0.001
No limitations in daily activities	0.039	0.075		-0.002	-0.005	-0.008	0.015
Weak disability	-0.158	0.054	***	0.009	0.018	0.031	-0.059
Sensorial disability	-0.026	0.045		0.001	0.003	0.005	-0.010
Care of her/him-self disability	0.031	0.059		-0.002	-0.004	-0.006	0.012
Participation in associations	-0.043	0.093		0.002	0.005	0.009	-0.016
Reading books	0.069	0.054		-0.004	-0.008	-0.014	0.026
Like meet relatives: does enough	0.395	0.090	***	-0.023	-0.046	-0.079	0.147
Like meet relatives: does not enough	0.139	0.098		-0.008	-0.016	-0.028	0.052
Like meet relatives: does not at all	-0.032	0.204		0.002	0.004	0.006	-0.012
Like meet friends: does enough	0.010	0.073		-0.001	-0.001	-0.002	0.004
Like meet friends: does not enough	0.015	0.089		-0.001	-0.002	-0.003	0.006
Like meet friends: does not at all	-0.127	0.156		0.007	0.015	0.025	-0.047
Like sport activities: does enough	0.167	0.069	**	-0.010	-0.019	-0.033	0.062
Like sport activities: does not enough	0.109	0.109		-0.006	-0.013	-0.022	0.041
Like sport activities: does not at all	-0.013	0.082		0.001	0.001	0.003	-0.005
Like religious activities: does enough	0.032	0.053		-0.002	-0.004	-0.006	0.012
Like religious activities: does not enough	0.101	0.077		-0.006	-0.012	-0.020	0.038
Like religious activities: does not at all	-0.168	0.084	**	0.010	0.019	0.033	-0.062
Like theatre: does enough	0.074	0.103		-0.004	-0.009	-0.015	0.028
Like theatre: does not enough	-0.015	0.123		0.001	0.002	0.003	-0.006
Like theatre: does not at all	0.237	0.114	**	-0.014	-0.027	-0.047	0.088
Like museums: does enough	-0.220	0.107	**	0.013	0.026	0.044	-0.082
Like museums: does not enough	-0.013	0.128		0.001	0.001	0.003	-0.005
Like museums: does not at all	-0.224	0.111	**	0.013	0.026	0.045	-0.083
Cut 1	-0.882	0.272					
Cut 2	-0.128	0.270					
Cut 3	1.279	0.271					
Observations	2931						
Wald chi2(48)	302.81						
Prob > chi2	0.000						
Pseudo R2	0.051						
Log pseudolikelihood	-2846.03						

Table 4.1.1b Ordered probit model estimates: satisfaction with friends' relations

				Marginal effects			
	Coefficient	Robust S.E.		Not at all	Little	Sufficiently	Very
Aged less than 35	0.027	0.190		-0.003	-0.004	0.000	0.008
Aged 51-65	0.092	0.115		-0.011	-0.015	0.000	0.026
Aged more than 65	0.188	0.110	*	-0.022	-0.030	-0.001	0.053
Male	-0.029	0.049		0.003	0.005	0.000	-0.008
Household size	0.044	0.025	*	-0.005	-0.007	0.000	0.012
North-West	0.060	0.072		-0.007	-0.010	0.000	0.017
North-East	0.009	0.071		-0.001	-0.001	0.000	0.002
South-Islands	0.022	0.058		-0.003	-0.003	0.000	0.006
Low education	0.024	0.070		-0.003	-0.004	0.000	0.007
High education	-0.052	0.131		0.006	0.008	0.000	-0.015
Household type: couple with children	0.046	0.147		-0.005	-0.007	0.000	0.013
Household type: couple without children	0.098	0.138		-0.011	-0.015	-0.001	0.027
Household type: father single-parent	0.427	0.211	**	-0.050	-0.068	-0.002	0.120
Household type: mother single-parent	0.012	0.094		-0.001	-0.002	0.000	0.003
Married/Cohabitant	0.096	0.132		-0.011	-0.015	-0.001	0.027
Being supported by familiar	0.614	0.045	***	-0.072	-0.097	-0.003	0.172
Being supported by others	0.149	0.068	**	-0.017	-0.023	-0.001	0.042
Adequate economic resources	-0.246	0.197		0.029	0.039	0.001	-0.069
Scarce economic resources	-0.239	0.199		0.028	0.038	0.001	-0.067
Insufficient economic resources	-0.250	0.223		0.029	0.039	0.001	-0.070
Good health	0.176	0.080	**	-0.021	-0.028	-0.001	0.049
Bad health	-0.132	0.051	**	0.015	0.021	0.001	-0.037
Chronic conditions	-0.023	0.066		0.003	0.004	0.000	-0.006
Severe limitations in daily activities	-0.095	0.055	*	0.011	0.015	0.001	-0.027
No limitations in daily activities	-0.011	0.072		0.001	0.002	0.000	-0.003
Weak disability	-0.077	0.053		0.009	0.012	0.000	-0.022
Sensorial disability	-0.061	0.043		0.007	0.010	0.000	-0.017
Care of her/him-self disability	-0.065	0.057		0.008	0.010	0.000	-0.018
Participation in associations	-0.003	0.099		0.000	0.001	0.000	-0.001
Reading books	0.077	0.050		-0.009	-0.012	0.000	0.021
Like meet relatives: does enough	-0.043	0.085		0.005	0.007	0.000	-0.012
Like meet relatives: does not enough	-0.121	0.095		0.014	0.019	0.001	-0.034
Like meet relatives: does not at all	-0.023	0.204		0.003	0.004	0.000	-0.007
Like meet friends: does enough	0.931	0.073	***	-0.109	-0.147	-0.005	0.261
Like meet friends: does not enough	0.539	0.086	***	-0.063	-0.085	-0.003	0.151
Like meet friends: does not at all	-0.029	0.157		0.003	0.005	0.000	-0.008
Like sport activities: does enough	0.241	0.068	***	-0.028	-0.038	-0.001	0.068
Like sport activities: does not enough	0.061	0.116		-0.007	-0.010	0.000	0.017
Like sport activities: does not at all	0.143	0.082	*	-0.017	-0.023	-0.001	0.040
Like religious activities: does enough	0.062	0.053		-0.007	-0.010	0.000	0.017
Like religious activities: does not enough	0.179	0.074	**	-0.021	-0.028	-0.001	0.050
Like religious activities: does not at all	-0.132	0.082		0.015	0.021	0.001	-0.037
Like theatre: does enough	0.150	0.110		-0.018	-0.024	-0.001	0.042
Like theatre: does not enough	0.122	0.139		-0.014	-0.019	-0.001	0.034
Like theatre: does not at all	0.100	0.106		-0.012	-0.016	-0.001	0.028
Like museums: does enough	0.025	0.113		-0.003	-0.004	0.000	0.007
Like museums: does not enough	-0.094	0.140		0.011	0.015	0.001	-0.026
Like museums: does not at all	-0.010	0.107		0.001	0.002	0.000	-0.003
Cut 1	-0.629	0.269					
Cut 2	0.429	0.268					
Cut 3	1.850	0.271					
Observations	2922						
Wald chi2(48)	857.12						
Prob > chi2	0.000						
Pseudo R2	0.127						
Log pseudolikelihood	-3162.45						

Table 4.1.1c Ordered probit model estimates: satisfaction with economic conditions

				Marginal effects			
	Coefficient	Robust S.E.		Not at all	Little	Sufficiently	Very
Aged less than 35	-0.424	0.239	*	0.061	0.095	-0.132	-0.024
Aged 51-65	0.124	0.125		-0.018	-0.028	0.039	0.007
Aged more than 65	0.365	0.117	***	-0.053	-0.082	0.114	0.021
Male	0.097	0.049	**	-0.014	-0.022	0.030	0.006
Household size	0.111	0.028	***	-0.016	-0.025	0.035	0.006
North-West	0.112	0.070		-0.016	-0.025	0.035	0.006
North-East	0.071	0.071		-0.010	-0.016	0.022	0.004
South-Islands	-0.041	0.060		0.006	0.009	-0.013	-0.002
Low education	-0.259	0.072	***	0.037	0.058	-0.081	-0.015
High education	0.102	0.145		-0.015	-0.023	0.032	0.006
Household type: couple with children	-0.005	0.173		0.001	0.001	-0.002	0.000
Household type: couple without children	0.107	0.169		-0.015	-0.024	0.033	0.006
Household type: father single-parent	0.263	0.231		-0.038	-0.059	0.082	0.015
Household type: mother single-parent	-0.177	0.096	*	0.026	0.040	-0.055	-0.010
Married/Cohabitant	-0.160	0.164		0.023	0.036	-0.050	-0.009
Being supported by familiar	0.185	0.046	***	-0.027	-0.042	0.058	0.011
Being supported by others	0.214	0.072	***	-0.031	-0.048	0.067	0.012
Adequate economic resources	-	-		-	-	-	-
Scarce economic resources	-	-		-	-	-	-
Insufficient economic resources	-	-		-	-	-	-
Good health	0.196	0.079	**	-0.028	-0.044	0.061	0.011
Bad health	-0.210	0.052	***	0.030	0.047	-0.066	-0.012
Chronic conditions	-0.058	0.065		0.008	0.013	-0.018	-0.003
Severe limitations in daily activities	-0.039	0.055		0.006	0.009	-0.012	-0.002
No limitations in daily activities	-0.055	0.070		0.008	0.012	-0.017	-0.003
Weak disability	-0.099	0.053	*	0.014	0.022	-0.031	-0.006
Sensorial disability	-0.072	0.044		0.010	0.016	-0.022	-0.004
Care of her/him-self disability	-0.039	0.058		0.006	0.009	-0.012	-0.002
Participation in associations	0.068	0.093		-0.010	-0.015	0.021	0.004
Reading books	0.053	0.053		-0.008	-0.012	0.016	0.003
Like meet relatives: does enough	0.126	0.086		-0.018	-0.028	0.039	0.007
Like meet relatives: does not enough	-0.010	0.095		0.001	0.002	-0.003	-0.001
Like meet relatives: does not at all	0.107	0.195		-0.015	-0.024	0.033	0.006
Like meet friends: does enough	0.104	0.071		-0.015	-0.023	0.032	0.006
Like meet friends: does not enough	0.124	0.088		-0.018	-0.028	0.039	0.007
Like meet friends: does not at all	-0.195	0.137		0.028	0.044	-0.061	-0.011
Like sport activities: does enough	-0.032	0.067		0.005	0.007	-0.010	-0.002
Like sport activities: does not enough	0.032	0.103		-0.005	-0.007	0.010	0.002
Like sport activities: does not at all	-0.111	0.080		0.016	0.025	-0.035	-0.006
Like religious activities: does enough	0.005	0.052		-0.001	-0.001	0.001	0.000
Like religious activities: does not enough	0.005	0.074		-0.001	-0.001	0.002	0.000
Like religious activities: does not at all	-0.054	0.087		0.008	0.012	-0.017	-0.003
Like theatre: does enough	0.228	0.099	**	-0.033	-0.051	0.071	0.013
Like theatre: does not enough	0.003	0.132		0.000	-0.001	0.001	0.000
Like theatre: does not at all	0.003	0.110		0.000	-0.001	0.001	0.000
Like museums: does enough	-0.009	0.101		0.001	0.002	-0.003	0.000
Like museums: does not enough	0.361	0.140	***	-0.052	-0.081	0.113	0.021
Like museums: does not at all	0.003	0.112		0.000	-0.001	0.001	0.000
Cut 1	-0.939	0.204					
Cut 2	0.724	0.203					
Cut 3	2.586	0.213					
Obsrevations	2922						
Wald chi2(45)	275.10						
Prob > chi2	0.000						
Pseudo R2	0.047						
Log pseudolikelihood	-2835.37						

Table 4.1.1d Ordered probit model estimates: satisfaction with leisure time

				Marginal effects			
	Coefficient	Robust S.E.		Not at all	Little	Sufficiently	Very
Aged less than 35	0.190	0.194		-0.036	-0.031	0.035	0.032
Aged 51-65	0.175	0.118		-0.033	-0.029	0.032	0.030
Aged more than 65	0.178	0.116		-0.033	-0.029	0.032	0.030
Male	0.122	0.048	**	-0.023	-0.020	0.022	0.021
Household size	0.033	0.027		-0.006	-0.005	0.006	0.006
North-West	-0.031	0.068		0.006	0.005	-0.006	-0.005
North-East	0.123	0.069	*	-0.023	-0.020	0.022	0.021
South-Islands	0.012	0.055		-0.002	-0.002	0.002	0.002
Low education	0.012	0.072		-0.002	-0.002	0.002	0.002
High education	0.097	0.137		-0.018	-0.016	0.018	0.017
Household type: couple with children	-0.065	0.171		0.012	0.011	-0.012	-0.011
Household type: couple without children	0.030	0.167		-0.006	-0.005	0.005	0.005
Household type: father single-parent	-0.051	0.175		0.010	0.008	-0.009	-0.009
Household type: mother single-parent	-0.032	0.088		0.006	0.005	-0.006	-0.005
Married/Cohabitant	-0.058	0.161		0.011	0.010	-0.011	-0.010
Being supported by familiar	0.144	0.044	***	-0.027	-0.024	0.026	0.025
Being supported by others	0.111	0.069		-0.021	-0.018	0.020	0.019
Adequate economic resources	-0.161	0.196		0.030	0.027	-0.029	-0.028
Scarce economic resources	-0.358	0.197	*	0.067	0.059	-0.065	-0.061
Insufficient economic resources	-0.339	0.218		0.064	0.056	-0.062	-0.058
Good health	0.037	0.077		-0.007	-0.006	0.007	0.006
Bad health	-0.232	0.050	***	0.044	0.038	-0.042	-0.040
Chronic conditions	0.040	0.066		-0.007	-0.007	0.007	0.007
Severe limitations in daily activities	-0.146	0.051	***	0.027	0.024	-0.027	-0.025
No limitations in daily activities	0.270	0.071	***	-0.051	-0.045	0.049	0.046
Weak disability	0.026	0.050		-0.005	-0.004	0.005	0.005
Sensorial disability	-0.117	0.042	***	0.022	0.019	-0.021	-0.020
Care of her/him-self disability	-0.127	0.057	**	0.024	0.021	-0.023	-0.022
Participation in associations	-0.079	0.088		0.015	0.013	-0.014	-0.014
Reading books	0.098	0.051	*	-0.018	-0.016	0.018	0.017
Like meet relatives: does enough	0.082	0.088		-0.015	-0.014	0.015	0.014
Like meet relatives: does not enough	-0.072	0.097		0.013	0.012	-0.013	-0.012
Like meet relatives: does not at all	0.009	0.202		-0.002	-0.001	0.002	0.002
Like meet friends: does enough	0.361	0.070	***	-0.068	-0.060	0.066	0.062
Like meet friends: does not enough	-0.050	0.087		0.009	0.008	-0.009	-0.009
Like meet friends: does not at all	0.070	0.167		-0.013	-0.012	0.013	0.012
Like sport activities: does enough	0.087	0.066		-0.016	-0.014	0.016	0.015
Like sport activities: does not enough	0.259	0.101	**	-0.049	-0.043	0.047	0.044
Like sport activities: does not at all	-0.017	0.077		0.003	0.003	-0.003	-0.003
Like religious activities: does enough	0.151	0.052	***	-0.028	-0.025	0.027	0.026
Like religious activities: does not enough	0.333	0.075	***	-0.062	-0.055	0.061	0.057
Like religious activities: does not at all	0.174	0.087	**	-0.033	-0.029	0.032	0.030
Like theatre: does enough	0.042	0.093		-0.008	-0.007	0.008	0.007
Like theatre: does not enough	-0.064	0.137		0.012	0.011	-0.012	-0.011
Like theatre: does not at all	0.325	0.098	***	-0.061	-0.054	0.059	0.056
Like museums: does enough	-0.019	0.106		0.004	0.003	-0.004	-0.003
Like museums: does not enough	0.389	0.139	***	-0.073	-0.064	0.071	0.067
Like museums: does not at all	-0.100	0.099		0.019	0.017	-0.018	-0.017
Cut 1	-0.817	0.280					
Cut 2	0.439	0.280					
Cut 3	1.818	0.283					
Observations	2920						
Wald chi2(48)	538.29						
Prob > chi2	0.000						
Pseudo R2	0.083						
Log pseudolikelihood	-3337.47						

Table A1. MV probit model estimates

	Relatives relations			Friends relations			Economic conditions			Leisure time		
	Coef.	r.s.e.		Coef.	r.s.e.		Coef.	r.s.e.		Coef.	r.s.e.	
Aged less than 35	-0.271	0.340		0.008	0.293		-0.239	0.257		0.419	0.285	
Aged 51-65	0.015	0.209		0.004	0.161		0.198	0.138		0.285	0.140	**
Aged more than 65	0.066	0.192		0.051	0.155		0.361	0.132	***	0.195	0.135	
Male	0.063	0.080		-0.002	0.066		0.124	0.056	**	0.168	0.057	***
Household size	0.137	0.049	***	0.058	0.035	***	0.114	0.031	***	0.036	0.032	
North-West	0.312	0.111	***	0.038	0.093		0.104	0.080		-0.015	0.081	
North-East	0.082	0.109		-0.025	0.093		0.031	0.080		0.110	0.082	
South-Islands	0.115	0.088		0.121	0.076		-0.049	0.066		-0.002	0.066	
Low education	-0.038	0.115		0.002	0.098		-0.332	0.080	***	-0.010	0.084	
High education	0.144	0.219		-0.159	0.195		0.001	0.154		0.097	0.149	
Household type: couple with children	0.122	0.282		-0.090	0.194		-0.060	0.191		-0.025	0.204	
Household type: couple without children	0.111	0.284		0.054	0.188		0.102	0.188		0.136	0.201	
Household type: father single-parent	0.330	0.369		0.214	0.245		0.118	0.244		-0.339	0.234	
Household type: mother single-parent	0.062	0.142		-0.109	0.123		-0.151	0.110		-0.067	0.109	
Married/Cohabitant	0.300	0.277		0.137	0.180		-0.157	0.183		-0.201	0.195	
Being supported by familiar	0.132	0.075	*	0.744	0.064	***	0.234	0.053	***	0.179	0.054	***
Being supported by others	0.681	0.089	***	0.149	0.079	*	0.140	0.079	*	0.150	0.080	*
Adequate economic resources	-0.097	0.322		-0.069	0.229		-	-		-0.068	0.210	
Scarce economic resources	-0.155	0.327		-0.015	0.233		-	-		-0.103	0.214	
Insufficient economic resources	-0.174	0.352		0.007	0.263		-	-		-0.043	0.240	
Good health	0.386	0.161	**	0.296	0.119	**	0.302	0.091	***	0.031	0.097	
Bad health	-0.283	0.080	***	-0.199	0.069	***	-0.177	0.059	***	-0.236	0.060	***
Chronic conditions	0.064	0.116		-0.153	0.097		-0.050	0.078		-0.044	0.080	
Severe limitations in daily activities	-0.039	0.087		-0.106	0.072		-0.035	0.063		-0.124	0.063	**
No limitations in daily activities	-0.024	0.131		-0.190	0.102	*	-0.051	0.083		0.272	0.086	***
Weak disability	-0.044	0.083		0.043	0.072		-0.078	0.062		0.091	0.062	
Sensorial disability	-0.003	0.068		-0.103	0.059	*	-0.071	0.051		-0.141	0.052	***
Care of her/him-self disability	0.035	0.098		0.022	0.081		-0.040	0.067		-0.090	0.068	
Participation in associations	-0.131	0.160		-0.154	0.143		0.072	0.104		-0.054	0.107	
Reading books	0.008	0.084		0.092	0.070		0.080	0.060		0.042	0.061	
Like meet relatives: does enough	0.511	0.114	***	-0.142	0.106		0.154	0.099		0.091	0.100	
Like meet relatives: does not enough	0.154	0.124		-0.269	0.117	**	0.013	0.108		-0.089	0.110	
Like meet relatives: does not at all	-0.033	0.236		0.070	0.212		0.144	0.223		0.027	0.221	
Like meet friends: does enough	0.087	0.103		1.129	0.085	***	0.036	0.082		0.347	0.081	***
Like meet friends: does not enough	0.083	0.117		0.570	0.100	**	0.127	0.097		-0.050	0.098	
Like meet friends: does not at all	0.001	0.190		0.108	0.173		-0.280	0.170	*	0.138	0.166	
Like sport activities: does enough	0.112	0.128		0.216	0.102	**	-0.031	0.079		0.091	0.081	
Like sport activities: does not enough	-0.076	0.163		0.048	0.137		0.011	0.122		0.089	0.128	
Like sport activities: does not at all	-0.173	0.121		0.048	0.103		-0.142	0.092		-0.133	0.095	
Like religious activities: does enough	-0.065	0.085		0.028	0.071		-0.002	0.061		0.181	0.061	***
Like religious activities: does not enough	-0.004	0.110		0.157	0.095	*	-0.001	0.083		0.352	0.086	***
Like religious activities: does not at all	-0.083	0.123		-0.195	0.106	*	-0.078	0.099		0.159	0.099	
Like theatre: does enough	0.272	0.188		0.348	0.176	**	0.251	0.121	**	0.072	0.125	
Like theatre: does not enough	-0.116	0.177		-0.014	0.163		0.033	0.140		-0.121	0.150	
Like theatre: does not at all	0.249	0.186		0.160	0.147		0.097	0.124		0.339	0.131	***
Like museums: does enough	-0.192	0.187		0.252	0.181		-0.031	0.127		0.021	0.136	
Like museums: does not enough	0.213	0.201		-0.137	0.173		0.314	0.151	**	0.303	0.160	*
Like museums: does not at all	-0.229	0.178		0.021	0.149		-0.035	0.124		-0.105	0.128	
Constant	-0.173	0.440		-0.498	0.343		-0.644	0.226	***	-0.613	0.311	**
Observations	2897											
Wald chi2 (189)	1364.1											
Prob > chi2	0.000											
Log pseudolikelihood	-5671.3											

Table A1. MV probit model estimates

	Relatives relations			Friends relations			Economic conditions			Leisure time		
	Coef.	r.s.e.		Coef.	r.s.e.		Coef.	r.s.e.		Coef.	r.s.e.	
Aged less than 35	-0.271	0.340		0.008	0.293		-0.239	0.257		0.419	0.285	
Aged 51-65	0.015	0.209		0.004	0.161		0.198	0.138		0.285	0.140	**
Aged more than 65	0.066	0.192		0.051	0.155		0.361	0.132	***	0.195	0.135	
Male	0.063	0.080		-0.002	0.066		0.124	0.056	**	0.168	0.057	***
Household size	0.137	0.049	***	0.058	0.035	***	0.114	0.031	***	0.036	0.032	
North-West	0.312	0.111	***	0.038	0.093		0.104	0.080		-0.015	0.081	
North-East	0.082	0.109		-0.025	0.093		0.031	0.080		0.110	0.082	
South-Islands	0.115	0.088		0.121	0.076		-0.049	0.066		-0.002	0.066	
Low education	-0.038	0.115		0.002	0.098		-0.332	0.080	***	-0.010	0.084	
High education	0.144	0.219		-0.159	0.195		0.001	0.154		0.097	0.149	
Household type: couple with children	0.122	0.282		-0.090	0.194		-0.060	0.191		-0.025	0.204	
Household type: couple without children	0.111	0.284		0.054	0.188		0.102	0.188		0.136	0.201	
Household type: father single-parent	0.330	0.369		0.214	0.245		0.118	0.244		-0.339	0.234	
Household type: mother single-parent	0.062	0.142		-0.109	0.123		-0.151	0.110		-0.067	0.109	
Married/Cohabitant	0.300	0.277		0.137	0.180		-0.157	0.183		-0.201	0.195	
Being supported by familiar	0.132	0.075	*	0.744	0.064	***	0.234	0.053	***	0.179	0.054	***
Being supported by others	0.681	0.089	***	0.149	0.079	*	0.140	0.079	*	0.150	0.080	*
Adequate economic resources	-0.097	0.322		-0.069	0.229		-	-		-0.068	0.210	
Scarce economic resources	-0.155	0.327		-0.015	0.233		-	-		-0.103	0.214	
Insufficient economic resources	-0.174	0.352		0.007	0.263		-	-		-0.043	0.240	
Good health	0.386	0.161	**	0.296	0.119	**	0.302	0.091	***	0.031	0.097	
Bad health	-0.283	0.080	***	-0.199	0.069	***	-0.177	0.059	***	-0.236	0.060	***
Chronic conditions	0.064	0.116		-0.153	0.097		-0.050	0.078		-0.044	0.080	
Severe limitations in daily activities	-0.039	0.087		-0.106	0.072		-0.035	0.063		-0.124	0.063	**
No limitations in daily activities	-0.024	0.131		-0.190	0.102	*	-0.051	0.083		0.272	0.086	***
Weak disability	-0.044	0.083		0.043	0.072		-0.078	0.062		0.091	0.062	
Sensorial disability	-0.003	0.068		-0.103	0.059	*	-0.071	0.051		-0.141	0.052	***
Care of her/him-self disability	0.035	0.098		0.022	0.081		-0.040	0.067		-0.090	0.068	
Participation in associations	-0.131	0.160		-0.154	0.143		0.072	0.104		-0.054	0.107	
Reading books	0.008	0.084		0.092	0.070		0.080	0.060		0.042	0.061	
Like meet relatives: does enough	0.511	0.114	***	-0.142	0.106		0.154	0.099		0.091	0.100	
Like meet relatives: does not enough	0.154	0.124		-0.269	0.117	**	0.013	0.108		-0.089	0.110	
Like meet relatives: does not at all	-0.033	0.236		0.070	0.212		0.144	0.223		0.027	0.221	
Like meet friends: does enough	0.087	0.103		1.129	0.085	***	0.036	0.082		0.347	0.081	***
Like meet friends: does not enough	0.083	0.117		0.570	0.100	**	0.127	0.097		-0.050	0.098	
Like meet friends: does not at all	0.001	0.190		0.108	0.173		-0.280	0.170	*	0.138	0.166	
Like sport activities: does enough	0.112	0.128		0.216	0.102	**	-0.031	0.079		0.091	0.081	
Like sport activities: does not enough	-0.076	0.163		0.048	0.137		0.011	0.122		0.089	0.128	
Like sport activities: does not at all	-0.173	0.121		0.048	0.103		-0.142	0.092		-0.133	0.095	
Like religious activities: does enough	-0.065	0.085		0.028	0.071		-0.002	0.061		0.181	0.061	***
Like religious activities: does not enough	-0.004	0.110		0.157	0.095	*	-0.001	0.083		0.352	0.086	***
Like religious activities: does not at all	-0.083	0.123		-0.195	0.106	*	-0.078	0.099		0.159	0.099	
Like theatre: does enough	0.272	0.188		0.348	0.176	**	0.251	0.121	**	0.072	0.125	
Like theatre: does not enough	-0.116	0.177		-0.014	0.163		0.033	0.140		-0.121	0.150	
Like theatre: does not at all	0.249	0.186		0.160	0.147		0.097	0.124		0.339	0.131	***
Like museums: does enough	-0.192	0.187		0.252	0.181		-0.031	0.127		0.021	0.136	
Like museums: does not enough	0.213	0.201		-0.137	0.173		0.314	0.151	**	0.303	0.160	*
Like museums: does not at all	-0.229	0.178		0.021	0.149		-0.035	0.124		-0.105	0.128	
Constant	-0.173	0.440		-0.498	0.343		-0.644	0.226	***	-0.613	0.311	**
Observations	2897											
Wald chi2 (189)	1364.1											
Prob > chi2	0.000											
Log pseudolikelihood	-5671.3											

Table A2. Probit model estimates

	Relatives relations			Friends relations			Economic conditions			Leisure time		
	Coef.	r.s.e.		Coef.	r.s.e.		Coef.	r.s.e.		Coef.	r.s.e.	
Aged less than 35	-0.243	0.339		0.064	0.292		-0.216	0.254		0.418	0.279	
Aged 51-65	0.017	0.204		0.012	0.163		0.195	0.138		0.278	0.141	**
Aged more than 65	0.080	0.188		0.067	0.156		0.362	0.133	***	0.175	0.137	
Male	0.063	0.081		0.005	0.066		0.131	0.056	**	0.161	0.057	***
Household size	0.143	0.049	***	0.051	0.036		0.113	0.031	***	0.032	0.032	
North-West	0.301	0.113	***	0.025	0.092		0.099	0.080		-0.042	0.081	
North-East	0.076	0.109		-0.034	0.093		0.023	0.080		0.079	0.083	
South-Islands	0.117	0.089		0.133	0.076	*	-0.054	0.066		-0.002	0.067	
Low education	-0.025	0.116		0.027	0.099		-0.323	0.080	***	0.028	0.084	
High education	0.120	0.222		-0.179	0.195		0.000	0.155		0.080	0.153	
Household type: couple with children	0.099	0.275		-0.129	0.195		-0.074	0.190		-0.037	0.204	
Household type: couple without children	0.087	0.274		-0.007	0.188		0.088	0.187		0.115	0.200	
Household type: father single-parent	0.361	0.373		0.210	0.243		0.119	0.242		-0.356	0.237	
Household type: mother single-parent	0.047	0.140		-0.106	0.124		-0.143	0.110		-0.061	0.109	
Married/Cohabitant	0.325	0.265		0.202	0.179		-0.143	0.181		-0.177	0.194	
Being supported by familiar	0.133	0.076	*	0.737	0.064	***	0.235	0.053	***	0.165	0.054	***
Being supported by others	0.678	0.090	***	0.148	0.080	*	0.145	0.079	*	0.143	0.080	*
Adequate economic resources	-0.061	0.323		-0.103	0.232					-0.133	0.220	
Scarce economic resources	-0.188	0.327		-0.129	0.234					-0.339	0.221	
Insufficient economic resources	-0.225	0.353		-0.144	0.264					-0.342	0.246	
Good health	0.393	0.163	**	0.316	0.121	***	0.300	0.091	***	0.034	0.097	
Bad health	-0.286	0.081	***	-0.207	0.069	***	-0.179	0.059	***	-0.213	0.060	***
Chronic conditions	0.069	0.117		-0.149	0.096		-0.059	0.077		-0.035	0.080	
Severe limitations in daily activities	-0.028	0.087		-0.103	0.072		-0.033	0.064		-0.126	0.063	**
No limitations in daily activities	-0.009	0.133		-0.211	0.102	**	-0.054	0.083		0.286	0.086	***
Weak disability	-0.029	0.084		0.045	0.072		-0.082	0.062		0.081	0.062	
Sensorial disability	-0.007	0.069		-0.095	0.059		-0.069	0.051		-0.134	0.052	***
Care of her/him-self disability	0.041	0.099		0.023	0.080		-0.040	0.067		-0.085	0.068	
Participation in associations	-0.129	0.162		-0.148	0.146		0.076	0.106		-0.057	0.109	
Reading books	0.013	0.085		0.112	0.068	*	0.084	0.059		0.051	0.061	
Like meet relatives: does enough	0.514	0.117	***	-0.161	0.109		0.152	0.097		0.087	0.099	
Like meet relatives: does not enough	0.148	0.127		-0.270	0.119	**	0.014	0.107		-0.078	0.109	
Like meet relatives: does not at all	-0.058	0.236		0.083	0.212		0.162	0.221		0.034	0.220	
Like meet friends: does enough	0.093	0.105		1.145	0.086	***	0.035	0.082		0.346	0.081	***
Like meet friends: does not enough	0.099	0.120		0.586	0.100	***	0.129	0.096		-0.050	0.097	
Like meet friends: does not at all	0.043	0.196		0.140	0.171		-0.279	0.170	*	0.146	0.167	
Like sport activities: does enough	0.103	0.128		0.212	0.103	**	-0.031	0.079		0.113	0.082	
Like sport activities: does not enough	-0.098	0.164		0.039	0.141		0.003	0.120		0.107	0.126	
Like sport activities: does not at all	-0.172	0.122		0.049	0.103		-0.141	0.092		-0.106	0.093	
Like religious activities: does enough	-0.063	0.086		0.025	0.071		-0.001	0.060		0.184	0.061	***
Like religious activities: does not enough	0.015	0.111		0.158	0.097	*	-0.005	0.083		0.362	0.086	***
Like religious activities: does not at all	-0.062	0.124		-0.184	0.103	*	-0.081	0.098		0.181	0.099	*
Like theatre: does enough	0.248	0.189		0.360	0.176	**	0.257	0.121	**	0.055	0.125	
Like theatre: does not enough	-0.148	0.176		0.017	0.162		0.038	0.142		-0.148	0.150	
Like theatre: does not at all	0.255	0.182		0.192	0.149		0.101	0.125		0.335	0.128	***
Like museums: does enough	-0.165	0.191		0.282	0.180		-0.036	0.127		0.011	0.135	
Like museums: does not enough	0.247	0.203		-0.161	0.172		0.314	0.153	**	0.302	0.159	*
Like museums: does not at all	-0.235	0.175		0.005	0.151		-0.031	0.124		-0.095	0.126	
Constant	-0.236	0.433		-0.462	0.342		-0.644	0.227	***	-0.479	0.315	
Predicted probability being satisfied	0.922			0.772			0.424			0.512		
Wald chi2(48)	286.480			707.120			223.880			412.570		
Prob > chi2	0.000			0.000			0.000			0.000		
Pseudo R2	0.150			0.242			0.058			0.113		
Log-pseudolikelihood	-850.618			-1305.092			-1863.879			-1780.051		